

# NASA TECH BRIEF

## *Ames Research Center*



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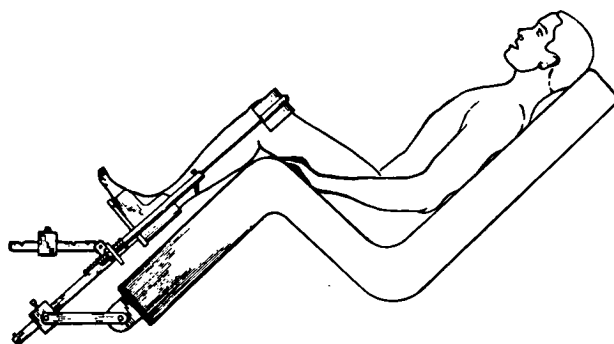
### Weight Simulator

#### **The problem:**

To minimize the loss of bone calcium during weightlessness or during an extended bedrest.

#### **The solution:**

A device which applies compressive force to a bone.



#### **How it's done:**

The device indicated in the diagram is relatively light in weight and easy to maintain and operate. It has been designed specifically for application of pressure to a leg bone; similar arrangements can be used to apply pressure to other bones in human beings as well as in animals.

The loss of normal body pressure on the bones during an extended bed rest or when the human body is in a weightless state results in loss of bone calcium. Studies have shown that decalcification of bones results in a high likelihood of bone fractures; moreover, calcinosis of the kidneys is a potential hazard at all times. Muscle movements such as may be provided by therapy or calisthenics usually do not produce enough stress in leg bones to prevent decalcification; on the other hand, experiments with

a compressive device of the kind illustrated in the diagram have indicated that the compressive stresses it provides will minimize loss of calcium.

The compressive force may be applied by weights (as shown) or by hydraulic, pneumatic, or electrically actuated devices. The electrically operated devices are particularly useful in that they are readily capable of supplying programmed compressive forces to the bone; for example, the sequence of forces can be made to imitate the bone stresses encountered in walking, jumping, or running, and they can be applied cyclically in accordance with a daily schedule.

#### **Note:**

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer  
Ames Research Center  
Moffett Field, California 94035

Reference: B72-10046.

#### **Patent status:**

This invention has been patented by NASA (U.S. Patent No. 3,550,585) and royalty-free license rights will be granted for its commercial development. Inquiries about obtaining a license should be addressed to:

Patent Counsel  
Mail Code 200-11A  
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